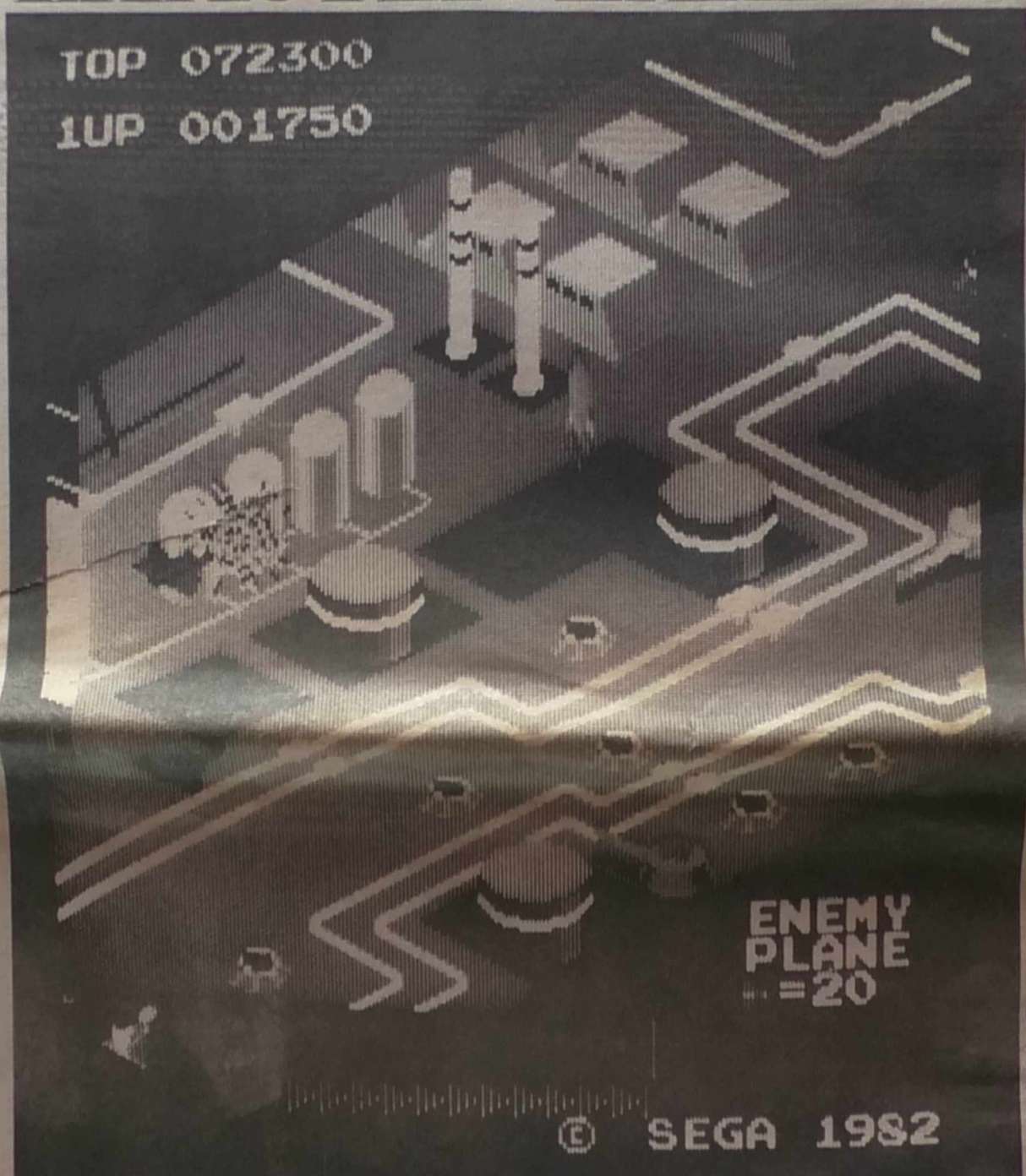


READER

VOLUME 11, NO. 28, JULY 15, 1982 SAN DIEGO'S WEEKLY

EXACTLY ZAXXON!



Photographs by Robert Burroughs

Gremlin Industries and the boinnngg, swooshh, zzzzap! —world of video games

Lane Hauck, standing at the console of the video game called Eliminator, jabs his four control buttons. He is carrying on a conversation with a bystander, and at the same time his illuminated score is mounting, mounting. Hauck ought to be good at Eliminator; he was one of the primary designers of the game, which Gremlin Industries built last fall at its plant on Aero Drive in Kearny Mesa. But this electronic creation is a match even for its creator. Hauck may be relaxed, but he plays alertly, fingers dancing, eyes fixed on the space battle booming on the screen. Of all the video

games Hauck has played, Eliminator is his favorite, despite the fact that when it hit the market, it flopped.

Some units were sold, but by the end of November, a mere six weeks after it was introduced, the game was doomed, a fact over which Hauck still seems to be grieving today. Of course, to anyone in the video-game industry, a flop is a major disappointment. For a company like Hauck's employer, Gremlin, a losing game can cost at least \$150,000, while a hit (such as the local company's current winner, Zaxxon)

(continued on page 8)

By Jeannette DeWyze

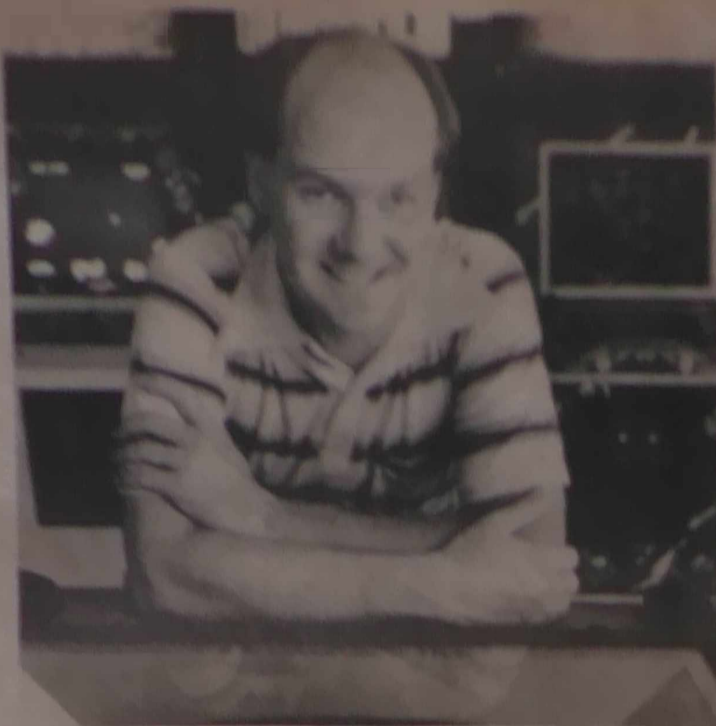
LANNON!

...the company up to \$100 million in sales. A high enough percentage increase like doubled Lannon to give the company five employees it had six years ago when it moved the video field to the 70s or so people who now work in the company, a lot different facilities throughout San Diego County. That's a lot more money in a new world system (probably) compared Lannon from a distant thing place position in the industry to first place, ahead of the traditional games Atari and Midway.

But it isn't the dollars Lannon failed to earn that seems to sadden Hauck most, his design-natural springs from from his belief that Lannon failed not because it was a poor game, but because the video-game audience wasn't really trained how to play it, and thus never had a chance to learn the subtle designs. Not that Hauck blames the audience. In fact he blames a lack of proper instruction. But he also blames himself for failing to open the mind flow in the Lannon designs. After years of laboring at the computer art of designing video games — an endeavor Hauck still calls his only real job in so many professions in the world — he has learned the hard way that the creation of truly great games must follow certain crucial design principles.

During the process of learning those principles, Hauck has also had his share of hell — games like *Centipede* and *Hard-On* and *Blades*. But given the multitude of video games that have come and gone since Atari first introduced *Pong*, those names are probably irrelevant to all but the most ardent video gamers. A video-game designer who came upon one of Hauck's works at an arcade might even dismiss it as a clamorous vulgarity. What that person would be missing, however, is an appreciation not only for the game's sophistication but also for how far the game design art has progressed since that day not so long ago when Hauck, fiddling around in a junk-filled laboratory at Kearny Mesa, came up with one of the first successors to the game family of *Pong* (the ping-pong simulation game).

Hauck is a technically inclined fellow with degrees in physics and engineering, and he had been back in the early 1970s that minicomputers would be the tool of the future. When his employer at the time, Lockheed, refused to purchase one of the new, dramatically more compact computing marvels, Hauck took the then fairly radical step of spending \$5500 on one of the Digital Equipment Corporation's PDP-8 minis. Upon moving to San Diego (to join the staff of Spectral Dynamics, an instrument manufacturer), he parked the minicomputer in a back bedroom of his



Larry Hauck



Frank Fogelman

house in Claremont. Hauck's plan was simply to learn the new technology, and as part of that process he played the various games that came with the system. (Such games, "played" on the machine's teletype printer, developed as a whimsical by-product of the new computers.) One that interested him was a logical-deduction game called *Moo*. Before long, he wanted to share it with his friends, so he turned to another love, simplifying complex technology in a way that made it more affordable. In this instance, that involved Hauck painstakingly soldering together twenty-five logic circuits, those compo-

nents that translate complicated information into simple yes-no impulses. The end product was an electronic box about the size of a large hand-held calculator which could do one thing — play a mean game of *Moo*.

Similarly, Hauck's next homemade plaything didn't involve his thinking up a new game, but instead taking an old one and adapting it to the developing technology. In this case, Hauck got the idea of building a little bread-box-size computer he could attach to his home television set and which would create (on the screen) the game of blackjack. Unoriginal, perhaps,

but this was Hauck's first video game design. "This was a machine that you didn't have a program other than an operating system, really just a video game console," he says. "It was a console that you put the game in."

Curious as to how the video game community at the time of developing video games in that game, Hauck took rectangular panels (which he had made last night by first hand with the video) and well like a painting and treatment of static pictures. The game's idea was of suggesting action and for a continuous series of lights within the expanded panel to light up in response to a game. The video signals. He used all Lannon's baseball wall game, for example, a series of little circles would light up to suggest, then creating the illusion of a moving baseball. As Lannon's wall game grew more and more sophisticated, the company's leaders began to realize the possibility they would have to add a new computer (the increasing generation of minicomputers, called a microcomputer) to the game assemblies to do the increasingly complex logical patterns. The use of Lannon's new technology (which was expensive, but the company's position and its desire to improve its position in the market themselves. That day in the Kearny Mesa office of a computer company, they happened to meet Hauck, who recalls, "They were in an upstairs who I had wanted to ask the right questions, while I was in there a desperate need to someone who really knew what he was talking about."

When the man from Lannon looked at Hauck's home-brewed computer video game, it convinced them Hauck was their man. Ironically, however, Lannon didn't hire Hauck to develop video games for the firm. Instead, Hauck spent a few months designing a new technology, wall game called *Forcewall*, using microcomputer technology. He says he periodically would ask the company president, Frank Fogelman, "How about video games?" but he was going to get into this business in a big way. Hauck remembers it. Fogelman kept saying, "Not yet." Nonetheless, when Hauck finished up his work on *Forcewall*, he settled down into his new job at Lannon and began tinkering. First he modified the little computer he had built at home to play the video blackjack game. Then he connected it up to a video monitor in his lab. He was playing with the machine on that day when the magic unfolded.

The thought had occurred to Hauck that it might be fun to use his electronic skills to explore an old physics problem in video: Drunk and the Lumpsum, in which the "drunk" starts out near the origin and can move in any direction, at random. The problem lies in predicting the direction in which the drunk will tend to move. To test out the problem visually, Hauck wrote a program in which the computer randomly

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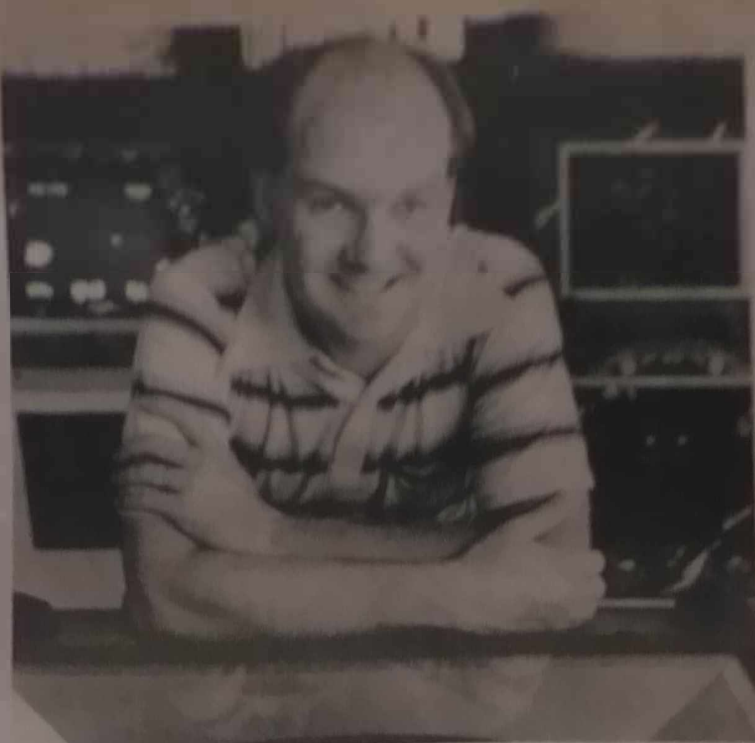
ZAXXON!

How did the company up to \$100 million in sales? A high enough percentage of successes has enabled Zaxxon to grow from the seventy-five employees it had six years ago when it entered the video field to the 750 or so people who now work in the company's six different facilities throughout San Diego County. Just a few years ago, Zaxxon was a distant third place position in the industry to first place, ahead of the traditional giants Atari and Midway.

But it isn't the dollars Eliminator failed to earn that serve as sudden Hauck's most, his disappointment springs more from his belief that Eliminator failed not because it was a poor game, but because the video-game audience never really learned how to play it, and thus never had a chance to know its subtle delights. Not that Hauck blames the players. In part he blames a lack of proper test marketing. But he also blames himself for failing to spot the fatal flaw in the Eliminator design. After years of laboring at the esoteric art of designing video games — an endeavor Hauck says still has only just ten or so true practitioners in the world — he has learned the hard way that the creation of truly great games must follow certain crucial design principles.

During the process of learning those principles, Hauck has also had his share of hits — games like Carnival and Head-On and Klax. But given the multitude of video games that have come and gone since Atari first introduced Pong, those games are probably unfamiliar to all but the more ardent video veterans. A videogame neophyte who came upon one of Hauck's works at an arcade might even dismiss it as a diabolical vulgarity. What that person would be missing, however, is an appreciation not only for the game's sophistication but also for how fast the game design art has evolved since that day in 1972 when Hauck, fiddling around in a junk-filled laboratory on Convey Court in Kearney Mesa, came up with one of the first successors to the giant family of Pong (the ping-pong simulation games).

Hauck is a technically inclined fellow with degrees in physics and engineering, and he had five years back in the early 1970s that minicomputers would be the tool of the future. When his employer at the time, Lockheed, refused to purchase one of the new, dramatically more compact computers, Hauck took the then fairly radical step of spending \$5500 on one of the Digital Equipment Corporation's PDP-8 minis. Upon moving to San Diego (to join the staff of Spectral Dynamics, an instrument manufacturer), he parked the minicomputer in a back bedroom of his



Lane Hauck



Frank Fogelman

house in Clairemont. Hauck's plan was simply to learn the new technology, and as part of that process he played the various games that came with the system. (Such games, "played" on the machine's teletype printer, developed as a whimsical by-product of the new computers.) One that entranced him was a logical-deduction game called Moo. Before long, he wanted to share it with his friends, so he turned to another love, simplifying complex technology in a way that made it more affordable. In this instance, that involved Hauck painstakingly soldering together twenty-five logic circuits, those compo-

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Similarly, Hauck's next homemade plaything didn't involve his thinking up a new game, but instead taking an old one and adapting it to the developing technology. In this case, Hauck got the idea of building a little bread-box-size computer he could attach to his home television set and which would create (on the screen) the game of blackjack. Unoriginal, perhaps.

But the fact was, Hauck's first video game, Moo, was a success. It was the first video game to be played on a television set, and it was the first video game to be played on a home television set.

Excited at the success of Moo, Hauck, naturally, began to think of making some thing better, or at least more. That was the regular game, though, but he didn't have long to wait before the idea of a new game came. The game's only rule of suggesting action was that a computerized army of robots within the computerized game to fight up to a dozen or so players. The game's logic, for one of Hauck's earliest video games, for example, a series of logic circuits would light up segments of the screen, creating the illusion of a moving battlefield. As Gamble, a well-known game designer and developer, says, "The company's leaders began to realize that you really had to have a way to add a way to compete the succeeding generation of minicomputers, called a minicomputer, to the game available to most of the commercially available logical games. The one at Gamble knew nothing about minicomputers, but the company's president and its director of engineering realized to educate themselves. One day at the Kearney Mesa office of a minicomputer dealer, they happened to meet Hauck, who recalls, 'They saw me, and I was a little nervous to ask for more questions, while I saw in them a desperate need for someone who really knew what he was talking about.'"

When the men from Gamble looked at Hauck's home-brewed computer video game, it convinced them Hauck was their man. Ironically, however, Gamble didn't hire Hauck to develop video games for his firm. Instead, Hauck spent a few months designing a new (non-video) wall game called Football, using microcomputer technology. He says he personally made ask the company president, Frank Fogelman, "How about video games? Are you going to get into this business or not?" Hauck remembers it. Fogelman says, "Not yet." But he did say, "You've finished up his work on Football, he's rolled down into his new lab at Gamble and began tinkering. First he modernized the little computer he had built at home to play the video blackjack game. Then he connected it up to a video monitor in his lab. He was playing with the machines on that day when the magic unfolded."

The thought had occurred to Hauck that it might be fun to use his electronic system to explore an old physics problem he calls the Drunk and the Lamppost, in which the "drunk" starts out near the lamppost and can move in any direction, at random. The problem lies in predicting the direction in which the drunk will end to move. To test out the problem visually, Hauck wrote a program in which the computer randomly

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ZAXXON!

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arrival on the market with Blockade, Gremlin faced a more immediate problem.

"We were stuck with many of these boards, lots of cabinets, lots of monitors. No demand for the product." As a result, Hauck's main inspiration for games at that point came from "walking through the stockroom and seeing which piles [of unsold material] were the highest. That's creativity in a very applied context," the thirty-six-year-old designer says.

One day recently Hauck said he thought he still had one of those early Blockade circuit boards in the "archives" of his office in Gremlin's Aero Drive facility. Pulling back a plastic wall divider, he revealed an antechamber filled with cardboard boxes overflowing with sundry electronic components. He began rooting through the electromechanical undergrowth. Within minutes he had flushed his quarry.

That circuit board, the "mind" of Hauck's first video game, is a light-green plastic rectangle eight and a half inches wide by eleven inches long. It looks a lot like a cheap toy model of a neighborhood, consisting mostly of black plastic

"houses" connected together by meandering, silvery footpaths. Hauck pointed out the "input-output" section of the neighborhood (the part that drives all the game controls, such as the push buttons and coin mechanism) and another section that drives the microprocessor. The actual computer, the microprocessor itself, looks like a miniature warehouse, a white plastic wafer maybe two inches long. "Over here is the video," Hauck says, indicating the circuits that tell the TV screen what to do. In the sound-effects corner, the transistors, capacitors, resistors, and the like resemble the neighborhood playground.

Hauck says he never really designed this particular circuit to do anything but play

Blockade and Commotion. "But being as how it was a microcomputer and it had plug-in memories, the obvious thing to do at that point [faced with the glut of Blockade parts inventory] was to quickly design another game that used the old hardware. Economic realities dictated it." This was Hauck's first really organized attempt to come up with a game, and unlike the creation of Blockade, he says, "It was work."

The result was Hustle, which resembled Blockade, with several added twists. Hustle pitted two players against each other, each controlling a snakelike video form. Each time one would crash into the other, both tails would grow longer, so that the end of the game resembled Blockade in the

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need to avoid crashing into "walls." In addition, the players shot at sporadically appearing targets. "Hustle did pretty well [commercially]," Hauck says. While it helped clear out the parts inventory, Hauck maintains that Gremlin still wasn't an efficient manufacturer. "We didn't have marketing to speak of. We kept buying more things than we needed."

Gremlin had not yet grasped the peculiar nature of demand for video products. Unlike traditional products for which demand over time builds gradually to a crest, and then slowly drops off, Hauck says the demand curve for video games resembles the shape of a skyscraper, shooting up suddenly, staying high for a short time, then

plummeting. "There's still a Blockade at the golf center," Hauck says, "but that's not the point. The way this business works, you make a game, then stop, and then you never make that game again." He says in contrast, the wall-game business had been steadier, but making up for the lost stability are the spectacular profits the video games generate. "Wall games could never make the same income. That's what killed 'em. That's what hurt pinball. Pinball's not quite dead, but it's suffering because a good pinball game might make \$200 a week. A really good video will make \$450 a week. If you were an arcade operator, which would you buy?"

For the same reason, Gremlin doggedly

determined to stick with the video products, and after Hustle, Hauck designed yet another game, Blasto, still using the same integrated circuit board. For the first time, however, Hauck's only contribution to the game was to write the specifications describing how the game should work. To write the actual computer code, Gremlin brought in a professional programmer. Unlike Blockade and Hustle, in which the game had started with an almost blank screen in which players built up a maze, Blasto opened with a "mine"-filled field which the player's "starships" had to blast away. "This creates great satisfaction; you think, 'I'm actually blowing the game apart.'" To satisfy the demands of Grem-

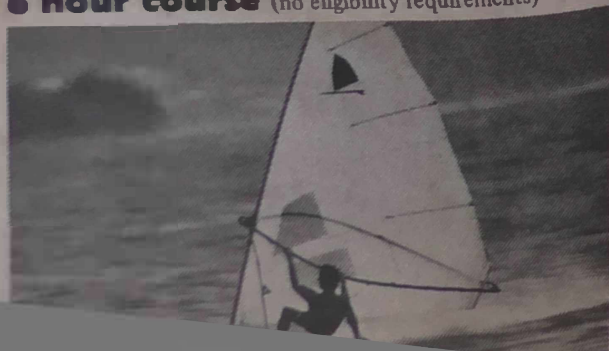
lin employees who complained that they wanted to play the game at times when they lacked partners, Hauck incorporated a one- or two-player option. Again, the game did relatively well, but Hauck puts that statement in perspective. He says Gremlin sold maybe 3000 to 4000 units of Blasto. In contrast, a big game at the time for one of the video giants (like Atari) would have sold some 30,000 to 40,000.

By this point Hauck was beginning to feel like a costume designer forced to outfit different successive actors in a set of clothing that had been custom-tailored for one person. He kept chafing at the limitations of the design of the first circuit board, so he

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ZAXXON!

(continued from page 11)

built a new one to expand what his games could do. "I had gotten into a defensive posture. After backing into this [the Blockade] board three times, I thought *maybe* we'd better design the new one to run a bunch of games. So it had much more memory [eight times what Blockade had used] and a better graphics system." With the new design, Hauck for the first time could get smooth motion (in any direction) on the video screen, instead of the jerky, checkerboard moves to which the first board had restricted him.

One of Hauck's favorite creative environments is the "boring professional seminar, especially the kind where they give you the notes ahead of time and the lecturer reads the notes. So you can flip through and know exactly what you'll be missing if you tune out." He says at such a seminar three separate ideas for how to use his new circuit board came to him. He still has the thick specification he wrote for one of them, Depth Charge, and a few units of the game itself can still be found around the county. At the controls of one in University City, Hauck starts the play. Immediately it is obvious what a technological leap Depth Charge represented.

To the distinctive sound of pulsing sonar, the player directs a destroyer which moves back and forth over an ocean teeming with deadly submanes. All the action on the screen is fluid and smooth. "I think I sorta invented a new weapon," Hauck chortles, pointing out that the submarines release mines which float to the surface and can there blow up the player's destroyer. "At least no one ever questioned me on it," he says. The depth charges that players send tumbling down from the destroyer to the subs are similarly unrealistic, but Hauck says that one of those golden rules of video design dictated this deviation from verisimilitude.

"I'd watched all those war movies where they'd yell, 'Set 'em all for fifty feet!' So I knew how a real depth charge works. You set 'em for a certain depth, and they only explode there." As a result, the game as it was originally designed featured a side lever which players had to adjust to set the charges. However, when Gremlin field-tested a Depth Charge prototype, "people weren't touching the depth charge lever. The charges would go right by the subs. Players would pound the console! Every single player had this problem. They wanted the game to play the way they *thought* a depth charge would blow up — on contact." Back to the lab went Hauck and the prototype, which was swiftly altered.

One other wrinkle marked the debut of Depth Charge. Frank Fogleman recalls that just a few days after Gremlin had applied for legal protection of the "Depth Charge" name, Atari showed up at the copyright office to file an application under the very same name for a game that was almost identical to Gremlin's initial prototype. Because Atari then had to change its game's name and refile, Fogleman says Atari suffered a slight delay in coming to the marketplace. When it did appear (complete with the tricky depth-setting mechanism) it never did as well as Gremlin's version. Fogleman says the incident prompted hours of speculation within Gremlin over whether Atari had pirated the idea. "Finally, we decided it was just coincidence. But you always wonder."

Hauck agrees it was probably chance. "When you spend a lot of hours, as I do, sitting around and trying to think up games, you soon realize that there really is a quite limited choice of what you can do." The second idea which came to him during the boring seminar was perhaps an exception — but its very originality jinxed it. Dubbed *Maestro*, it would have required players to race each other to identify electronically synthesized tunes, but Hauck says the problems with securing permissions to use the songs stymied the

project. Gremlin did build his third idea, a game called Fortress. But when the company field-tested it, the game met with only a lukewarm reception, so it was scrapped.

"But I like this game," says Hauck, standing in front of one of the few Fortresses still in existence. On the screen are a pirate ship, a fortress, and three cannons, which the player controls with three separate firing buttons and which he uses to defend the fortress. Like all of Gremlin's games up to that point, the screen included a timer, which limited the length of play. However, if a player reached the end of the time with part of his fortress remaining, he could go into extended play (during which the pirates would attack more and more aggressively). The innovation reflected a growing conviction in the video-game business that another vital principle of game design is to give the player at least the illusion that a quarter will allow him to play forever (if he just gets good enough). "Nowadays it's suicide to have a timed game," Hauck declares.

Fortress also incorporated another indication of Hauck's growing cunning. Back when Gremlin had test-marketed Blockade at the miniature golf center, Hauck learned a lesson about the unexpected ways players may interact with the games. One day, while lurking around the center, Hauck had spied a mother and daughter at the Blockade console, but to his amazement, instead of following the rules, according to which they must try to avoid hitting each other, "they would immediately head for each other on just the shortest path, and then they'd hit, hear the explosion sound, and laugh their heads off. Then they'd put a quarter in and do it again. It was the funniest thing. My first impulse was to go over and tell 'em, 'Sorry, you must not have read the instructions.' But then I thought, 'Who am I to tell 'em not to put their money in?'" He decided the game designer should instead try to plan ahead for unconventional play methods, and in Fortress he applied the lesson. Hauck figured that eventually some player would get

the bright idea of getting two friends and putting one man on each cannon, thus allowing three people to play for one quarter. So Hauck designed the game with score counters under each individual cannon, something no one would really even understand until he had thought up the three-player scheme. "We want the player to feel that he's figured something out and is really pulling something on us. Anything to get those next quarters. Discovery's an important thing in a game. For the macho arcade player you want to have some things that aren't laid right out."

Hauck was strolling through an arcade one night when suddenly he noticed something beside such a macho game player: that player's girlfriend. "When I looked, one thing that became very obvious was that the women in the arcade were baggage. They weren't there to play games. They were there admiring their man as he shot the thing. And I thought, what an easy way to expand the market — make a game that's appealing to women." In fact, he figured all he needed to do was to create a game that didn't alienate women the way so many shooting and driving games do. The result was Hauck's next creative effort, Frogs.

Frogs (distinctly different from another popular Gremlin product last year called Frogger) was consciously charming. Amidst a lush, blooming swamp, the video frog (at the player's command) would leap up toward passing butterflies and insects. To snatch them, the player had to push a "tongue" button. The little drama was accompanied by the most sophisticated sounds Hauck had ever produced: a suction noise each time the frog landed on his lily pad, a Walt Disney-style "booingggg" to accompany the jumps, croaks and buzzes and tongue whips. Once again, Hauck cheated physics by having the frog go up and down at a constant rate, instead of accelerating and decelerating, as would a real jumping amphibian. Frogs did fairly well, but in contrast, Hauck's next effort was a bonafide triumph.

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RECORDS-TAPES

JOE NIGHT

"People are too concerned or whether their 'street' is going to be hip forever and produce the best

JOE JACKSON

ZAXXON!

(continued from page 13)

"Head-On just . . . came to me," he says reflectively. "It wasn't anything I saw on the screen like with Blockade. I just flashed on the idea of having fixed lanes all the way around the screen, and once you're in a lane, you're committed. Also, there were dots in the lanes, which bleeped and disappeared and added to your score every time you went over them. This was the world's first dot-eating-up game!"

Hauck's experience with Heads-On also illustrated how a game concept can be fatally flawed. Fortunately for Hauck, he caught this one before production. He initially had envisioned the game as having two players going around the lanes, trying to avoid head-on collisions. But he says in the design stage it became apparent that "if I was ahead, my best strategy was to go after you and crash and end the game. But that's a terrible contradiction because one of the things people want to do is to extend the time they can play. We had two completely mixed objectives. Yet we tried and tried and tried to make this two-player thing work." Only when he was almost ready to junk the project did Hauck recall an afterthought to his original inspiration, the idea of pitting the player not against another player but against a computer-driven car. "And that's when the thing took off, with this idea of the computer having some intelligence that you could see. That's when I couldn't get people off the system."

This was in 1978, and in September of that year Fogleman had committed his company to a major change. "We could see the boom coming, and we knew it would take huge amounts of capital," Fogleman recalls. To obtain that needed infusion, he sold Gremlin for an undisclosed number of shares of a Los Angeles-based corporation called Sega Enterprises, Inc. itself a division of the



Rancho Bernardo facility

giant Gulf + Western Industries, Inc., Sega already owned several divisions, including a Japanese video game manufacturer called Sega Enterprises Limited, and another division that operated video arcades. Hauck recalls that the San Diego employees fretted over whether the sale would hurt them, but almost immediately the engineering department got an insight into how it could help. "Head-On was seen in Japan," Hauck says, "and they had an industry veteran there who had invented every game Sega had ever done. He was a very venerated guy on the verge of retirement, and he had seen Space Invaders, which introduced the concept of



local arcades.) Conversely, the Japanese could take popular Gremlin games and produce them in their country. They did so with Head-On, and Hauck says it did better in Japan than any other Gremlin export since.

Flushed with these successes, Gremlin decided that the end of 1978 was the proper time to dazzle the industry with a true technological innovation. "Color had been used on a few specialty games — limited-edition, high-priced items which can't be installed just anywhere," Hauck explains. "But color had never been used on a mass scale." Gremlin decided to break from the pack by introducing two color-game sequels, Head-On 2 and a more sophisticated version of Depth Charge called Deep Scan. Unfortunately, several factors blunted the success of the pioneering effort.

First, no video game sequel has ever done well, according to Hauck. (He chalks up Midway's success with Ms. Pac-Man to the public's still-unsatisfied appetite for that company's original Pac-Man.) Furthermore, Gremlin coupled the introduction of the color-game sequels with another innovation, a marketing one. The idea was to increase the appeal of Gremlin games to arcade operators by packaging two games in one console. However, in practice the idea confused the public and it never really caught on.

Ironically, another consequence of its technological leadership caught Gremlin off guard. Fogleman says when Gremlin brought out the color games, it had no idea how well the change would be accepted. "We were hoping maybe twenty-five percent of the business would go to color." Within sixty days, however, Fogleman says, "We found ourselves with warehouses full of black-and-white monitors. We never dreamed it would be so dramatic."

Hauck expands: "There are two kinds of innovations in games. There's the kind that's a fad and goes away quickly, and there's the other kind that becomes a fixture. If you don't have it, you're dead. And

color was certainly in the year it went from blue games to ninety-eight percent.

The game designer's speech synthesis is a kind of innovation that's a gimmick. "You know your eye on these technologies in become cheap, you design games on technology-driven incidents." Speak and Spell the speech technology got [computer] spend out how to do it, on games. We were would to be like color, wh

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we eliminate the timer we had put in Head-On, and we incorporated the suggestion. That way, if a player got really, really, really good, he could play for maybe ten, fifteen minutes. I think this was a key to making the game big. You gotta be open to those suggestions. You never know what's going to be the pivotal thing that makes a game really great."

Gremlin soon saw other benefits from the acquisition. Now it could market in America successful games concocted by the designers for Sega's Japanese arm. One of the first such games, for example, was a driving simulation called Monaco GP, which has proved to have remarkable staying power. (Many still can be found in

color was certainly in that category. In one year it went from like two percent color games to ninety-eight percent."

The game designer contrasts that with speech synthesis, a good example of the kind of innovation that turns out to be mere gimmick. "You know, you always have your eye on these technologies, waiting for them to become cheap, and when they do, you design games around them. It's a technology-driven industry. Texas Instruments' Speak and Spell kind of heralded the speech technology, and we went and got [computer] speech chips. We figured out how to do it, and put them in our games. We were wondering, Is this going to be like color, where you gotta have

speech or you can't sell 'em? But it turned out that it isn't."

In fact, that first speech-synthesis game, a game called Space Fury, which was designed not by Hauck but by one of Gremlin's computer programmers, burned the company badly. Introduced about 1980, it incorporated a human voice into the play. It also utilized a new form of color television technology, which proved to be its mechanical failing. Plagued by overheating transistors, the game units in the arcades would simply cease functioning, so badly besmirching Gremlin's reputation for quality that the company is still battling the negative image. But quite apart from Space Fury's mechanical difficulties,

Hauck says the experiment with speech taught him another vital game principle.

"The problems with speech are some of the same ones you have with any kind of sound effect in a game. There are two extremes: you have a decibel war going on in the arcades, where you're lucky to be heard over the hundred-watt monsters next to you; worse is if you're in a quiet location like a bar. There the spiffy sound effects may sound funny and unusual to the customers, but how about the bartender who's been listening to this for a week? If he can't find the volume control, he'll go in and cut the wires. So you can't use only sound to announce something happening in the game, because you can't always assume

it's going to be heard. Let's say something comes ripping across the screen so fast you can hardly see it, and the only way you can hit it is by hearing a hell sound. That would be deadly! Because if the hell sound weren't there, you'd never hit anything. You can't make sound the only cue."

Hauck says Gremlin today views speech as an additional expense that must be carefully scrutinized. "It's just a hell," he thinks for all the time spent by manufacturers agonizing over details like the cabinets, the side panels, or the control panel, the basic play concept behind any game accounts for ninety-five percent of its success or failure. "If Space Invaders

Continued on page 10

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ZAXXON!

(Continued from page 28)

had come out as an orange crate with no graphics, it would have done just as well. The problem is when you don't have the real thing — the authentic, new, creative product — then all you can do is copycats."

Happily, Hauck's next game, Carnival, seemed to combine both a sprightly concept and inner with an appealing game concept, and to mix them together with some witty refinements. The game concept behind Carnival was obvious — it was essentially a shooting gallery. Players fired a video gun at rows of traditional targets such as ducks, bears, owls, and rabbits. One novel twist was that if a player failed to hit a duck soon enough, the quacking bird would suddenly fly toward the bottom of the screen, and if not stopped by gunfire, would eat ten of the player's bullets (thus hastening the game's end).

That's what the novice saw of Carnival. But Hauck deposited in the game a rich mine of discoveries for the more sophisticated gamblers. For example, hitting certain animals that moved around the targets increased the player's bullet stock. Hitting moving targets in the sequence H-O-N-U-S gave him extra points. These and other refinements were explained in the rules on the game machine. But Hauck says it takes most players maybe twenty-five games just to reach the point where they realize they don't know all the subtleties. "In machine games, you never read the first game," he says. "Instead, the game creator must place in the machine the barrier between the machine being and the machine." A bad machine designer designs a game you can't play the something without reading the manual. A good one is a very complex game like Zaxxon which can be controlled with one joystick and a button, without reading the manual.

As for the video games, I would say they are designed to become more difficult with



Zaxxon circuit board

each successive round, something the game designer achieves by arming the computer program with a complex mathematical table. "Once in a while, players surprise us. I made the fifth round in Carnival so difficult that you can hardly believe it. You have to hit almost everything to get past it. But people get that good." Really top players might typically go ten minutes, he says, adding that the only other way a crafty player might extend his play abnormally was if he sacrificed point accumulation in favor of only surviving. "Theoretically, he could sit there and

do that forever," Hauck says. "However, we added a doomsday timer. It tells us that after three minutes in the first round, this guy's playing games with us." Once the timer is tripped, the game starts sending the player an almost uninterrupted stream of ducks. "After a while, he can't shoot them fast enough."

Even Carnival's music, an arrangement of the traditional calliope song "Over the Waves," is more than meets the ear. Hauck points out that every time the tune repeats, it ascends in pitch and speeds up slightly. "People play and they realize they're really getting pumped up, and

they're not quite sure why. But the game is moving faster, the targets are moving faster, the music is going up in both pitch and speed. They're just all the little details you weave into the fabric."

With Carnival, which had sixteen times as much memory as Blockade, the task of programming the game had grown to exceed the capability of one single programmer. Hauck instead found himself doing what has today become routine: managing programming teams composed of several people. He likes to have them work within a basic framework. "You gotta have a dictator, I think. Someone who's played the game in his head and who can answer questions just out of a feel for the game." But at the same time he says he tries to allow his programmers the room for creative improvisation. "Some of the very best features of some of the games that have been called 'my' games have been done by these programmers. For example, we have a game underway now where I told the programmer that we would blow up an object when the player shot it. And he came up with the most sensational explosion I've ever seen. I mean, there are lots of ways to blow something up. You kind of have to see it. But it's startlingly good. And I didn't say to blow it up that way. I never would have thought of that."

Conversely, Hauck says at times ideas sound great in a game specification, but when a programmer executes them and they play out on the screen, they're revealed to be otherwise. "Take the idea of having bad things happen to the player if he doesn't play well. Let's say you have a cannon to shoot, and every time it gets hit its firepower is decreased or it slows down a little bit. That's a great concept. But it turns out you never, never ever want to do that. Every time you try it, you know right away that it's the wrong thing to do. Because if you take control away from the player, he feels he's been cheated by the machine. The one thing you've got to give him is a very clear cause and effect. Otherwise that player's gonna start banging on the controls. All he perceives, and

he's right — is the lack of control over it, and he'll go a control."

Carnival came. Another Grenline Astroblaster was winter. (Although Hauck says it was rival Astrofighter) time, the company manufacture of games, game development. Of these, it was Frogger, a style game, of 25,000 units since

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he's right — is that he has just suffered a lack of control over that machine, damn it, and he'll go and play a game he can control."

Carnival came out in the spring of 1980. Another Gremlin-developed game called Astroblaster was introduced the following winter. (Although it was quite successful, Hauck says it was unoriginal, a copy of the rival Astrofighter game.) Around the same time, the company experimented with the manufacture of a variety of licensed games, games developed outside the company. Of these, the most successful by far was Frogger, a happy-go-lucky cartoon-style game, of which Gremlin has sold 25,000 units since its introduction last Sep-

tember. Since then, games developed by Sega's Japanese arm and manufacturers have been cause for even more riling. The trouble began in November with the introduction of a more sophisticated driving game (from Japan) called T which today remains high on the industry's top ten lists. In April the situation reached a fever pitch with the appearance of Zaxxon.

Frank Fogleman, who still works for Gremlin as vice chairman of the board, says he predicted after the second showing of Zaxxon "that if it wasn't our best game ever I would quit the business. A space game featuring rich visual display in such a way as to appear i-



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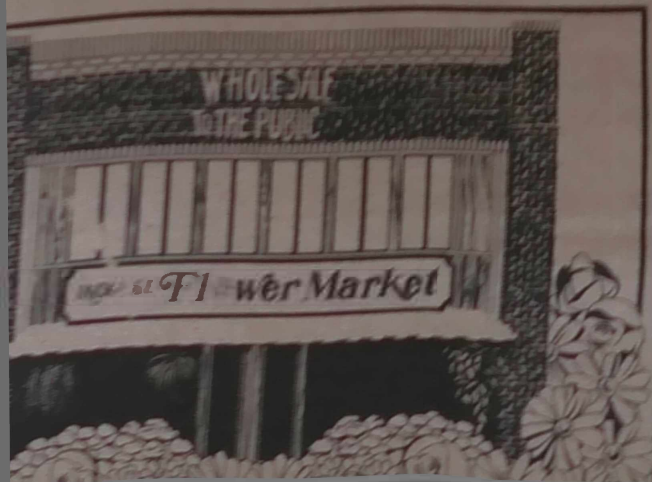
dimensional. Zaxxon almost resembles a crude, primitive movie, one in which the player/audience participates by controlling a rocket-fighter through Star Wars-style space cities and monstrosity-filled voids. It has twenty-eight times the memory that Blockade had, one entire integrated circuit board is devoted to producing its otherworldly battle sounds. Gremlin's market-research analyst says when she heard the income figures for that test period, she called the arcade operator and told him the machine had to be broken — the figures were too high to be believed. Although that prototype had none of the flashy graphics which would dress up the final model, the game was earning seventy-five

to eighty dollars per day on weekends. (In comparison, forty to fifty dollars per weekday is enough for Gremlin to declare a success.)

Yet despite that red-hot start, Gremlin still maintained the prototype in the field for three to four weeks, and then sent the game back to Japan for modifications (for example, the combat interludes between space cities were shortened) before introducing the final version. Hauck says that caution was a deliberate reaction to the experience with Eliminator.

When he discusses that experience, he still sounds troubled. Hauck says in the past he always had a dependable method of

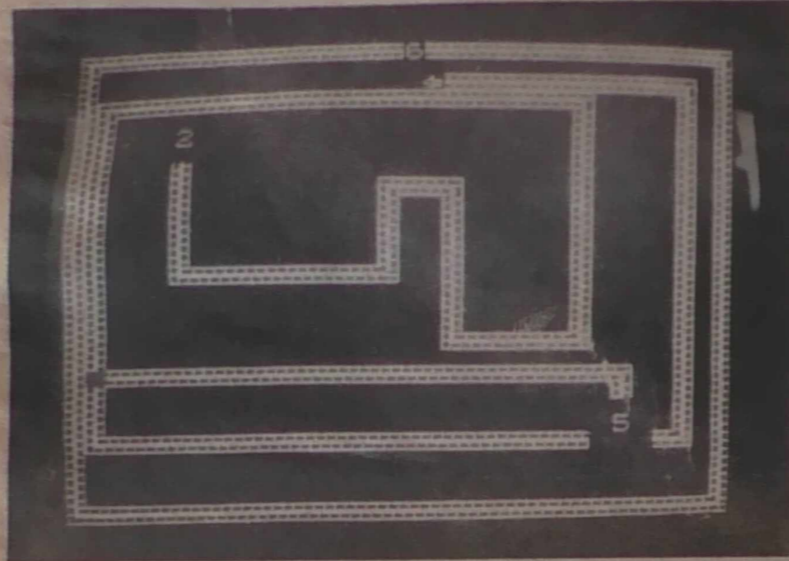
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Blockade

ZAXXON!

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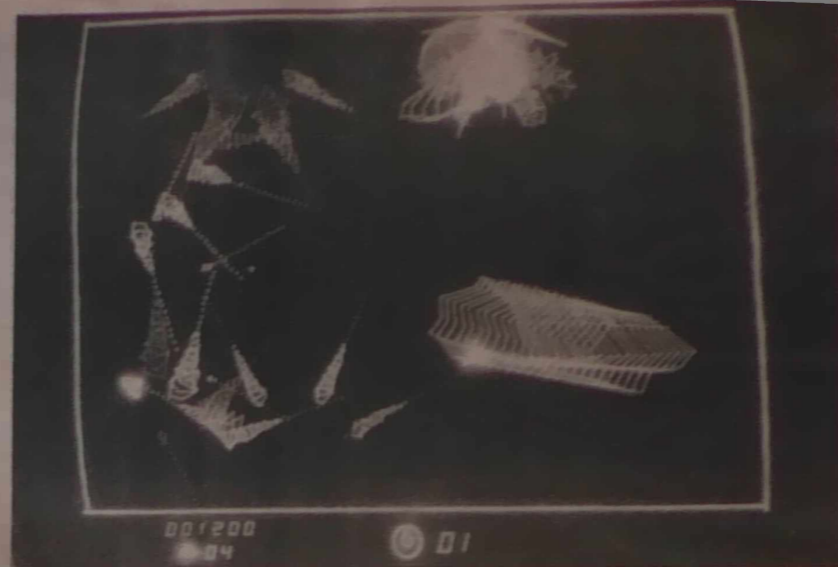
telling if a game was good, he would play it in his head and see if it was fun. It was that simple. But Eliminator (which was also introduced about last September) tricked him, it was a joy to play. That is, it was a joy for experienced gamers. What Hauck and everyone else at Gremlin failed to see was how the game could baffle those who were new to it. "I think we tried to do too much that was new. Too many things happened too quickly." Though the experience evidently chastened Hauck, he claims to view it positively. He says his own next game will consciously incorporate lessons learned from Eliminator, and on a broader scale he thinks it taught Gremlin an unforgettable lesson about testing.

Testing at Gremlin is the province of Elizabeth Falconer, the company's market-research analyst. Falconer looks like a person one might see most likely in Adult Video Games. Tall and elegant, she has delicate features and long golden hair, but when she takes the controls of one of the Zaxxon units as she did one recent day at the Yellow Brick Road arcade in University Towne Centre, teen-age boys gravitate toward her and watch with silent respect. Cool as a cucumber, Falconer guided her spaceship through the animated space crises, picking off the most important targets. She easily racked up 78,800

points, besting the previously high player of the day and thus earning the right to install her initials on the screen (yet another device for boosting player egos and thus coaxing more quarters out of them).

Falconer plays a lot of games in the Gremlin offices, as do other seasoned players within the company. In fact, up to a year or so ago, such in-house trials were the company's major form of testing. But the last explosive year in the video industry has changed that, Falconer says. Arcades have already been installed in almost every place that could economically accommodate them, and now the only new installations are one or two units at a time in places like bars and markets. As a result, Falconer says the arcade operators are becoming highly sophisticated buyers of new games. (Arcade owners buy the games outright from distributors, as opposed to leasing them, as they might a jukebox.) "A lot of them won't take a game that hasn't proved itself in a thirty-day field test," she says. To increase the chances of that happening (successfully hobnobbing for the company to bring in panels of game players to help test new creations. Once the testing phase ends and the game is thrown out in the world, it faces a brutal test for survival. "If you put a game out and it doesn't jump up into the top five within a week, you can pretty much scratch it," Falconer says.

To tell where its games stand, Gremlin claims it can't rely on the ratings published by the two industry magazines, the semi-



Eliminator

monthly *Play Meter* and the monthly *Replay*. The figures upon which those ratings are based are often inappropriate, and besides, by the time they're published they're already too old, according to Duane Blough, Gremlin's current president.

Blough says instead that every Monday afternoon he receives a report describing how a cross-section of all video games have performed during the past seven days. The data from just one arcade could be misleading, since some games do better depending on the nature of the arcade. A macho shooting game like Zaxxon, for example, does best at locations like Spanky's on Midway Drive, where lots of servicemen congregate. Thus, Blough's figures come from twenty-five arcades located all across the United States. Furthermore, even the data generated by the combined reporting must be interpreted artfully. While most hit games win instant acceptance, a few sleepers break the rules; one example is Atari's Centipede, which started slowly but built to a winner which refuses to die.

If assessing the individual game's performance is a tricky enterprise, it's also difficult to rank the game manufacturers' standing, Fogleman contends. He says annual reports reveal part of the picture. Thus, the 1981 annual reports showed Gremlin to have sales of \$150,619,000, compared with \$289.9 million for Midway. Atari, the perennial industry leader, does not divulge its sales figures. But Fogleman asserts that the video-game

business moves so fast that any manufacturer's standing can quickly change dramatically depending on whether its current offerings are hits. Hauck concurs: "I don't know any other industry where you're one game away from oblivion." Given the fact that Gremlin has had a string of three big successes, while Atari and Midway have been fielding relatively weak games, Hauck and Fogleman say for the first time it's possible that Gremlin may already be moving into second or even first place.

And this time the company is determined to avoid losing its advantage for lack of manufacturing capacity. Still smarting from the memory of the embarrassment of not being able to build Blockade quickly enough, Gremlin started an ambitious expansion project in 1980. That program reached completion this past April with the opening of an impressive 125,000-square-foot facility just down the road from the Hewlett-Packard plant in Rancho Bernardo.

In addition to his office on Aero Drive, Fogleman has an office at the new plant. The second-floor building, named and designed by him, is also decorated by several large wall graphics, one a cut-out of a scene from Zaxxon, another showing a rocket exploding after being hit by one of the Eliminators. The front lobby downstairs contains chairs and a coffee table done in video-bright colors and upright models of Zaxxon, Turbo, and Frogger. But these are some of the only clues to the fanciful products of this factory.

"We've built a very automated assem-

more, the plant also solves the problems of quality that lin's past. Fogleman lead dim, sweltering room where of the assembled brains units sit playing for twenty time in the 120-degree heat. It's the hottest day in F is the biggest advantage. Fogleman explains. From tronic subassemblies and cabinets and all the other components move to the 1 bly lines currently devoted Zaxxon. As each game line, at two-and-a-half-n

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ty," Fogleman says proudly. Furthermore, the plant also reveals a reaction to the problems of quality that haunted Gremlin's past. Fogleman leads the way to a dim, sweltering room where row after row of the assembled brains for the Zaxxon units are playing for twenty-four hours at a time in the 120-degree heat. "This simulates the hottest day in Peoria. Temperature is the biggest adversary of electronics," Fogleman explains. From there the electronic subassemblies and the bare wooden cabinets and all the other assembled sub-components move to the four final assembly lines currently devoted to churning out Zaxxons. As each game moves down the line, at two-and-a-half-minute intervals,

one more item is added: here the side panels ("the dress for the game"), there the coin systems, and so on. The games roll off (at a rate of 400 to 700 games a day), then they move to one final line-up where, standing in neat rows, they silently, methodically, relentlessly play against themselves.

Hauck says it all seems to be jelling nicely: the manufacturing capacity, the quality control, the marketing strength — and one other thing that is most important to him personally. As the market has evolved it has become "really, really tough," he says. "Each game has gotta be great, or forget it. You won't sell any of 'em." In response, he says, "I'm the guy

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who's working hardest of all to get more people to develop games. Because I don't like the pressure."

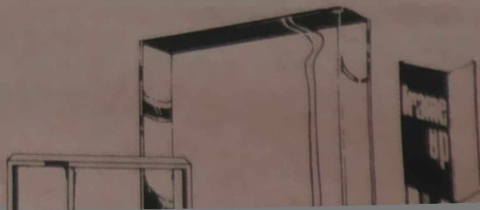
He's learned what doesn't work — brainstorming sessions, for instance. "They've been absolute disasters. Games by committee are like most things by committee." He has a concept of what makes a good game designer. "A lot of them come from computer disciplines. But they might come from other places, too, like people who write cartoons." Critical is the ability to work within the limitations of the medium. "A movie screenwriter probably wouldn't work out because in movies he doesn't have the problem of making it run on currently cost-effective

hardware. Anything you want to do in a film you can do. But here it's gotta be achievable at low cost."

Hauck says today Gremlin has a number of company game design groups, "but mainly we're looking to our programmers to supply ideas. If anybody even looks like he has an aptitude for games, we give 'em his head, let him do whatever he wants for a while." He estimates that ninety-five percent of such efforts haven't succeeded. "But you only need a few winners to justify it. The trouble with creativity is that you can't teach it and you can't schedule it."

Hauck has strong convictions about
(continued on page 20)

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ZAXXON!

(continued from page 19)

those things which historically have fueled his own creativity. "I'm a big believer in the subconscious. The times when I've created the best is when I'm working the hardest, doing the most. Going to seminars. Reading books. Listening to jazz. Talking to people. Walking around arcades. The more inputs you can cram into your subconscious, the more it works for you, and pretty soon the ideas start coming."

He says his own ideas for games have

been coming as fast as ever, but he's developed a keener eye for spotting those that aren't worth developing. And the pressure to predict which ones will be successes after the nine-or-so-month gestation period which video games now require continues to mount. "Some of it you can see in the arcade. You can watch the patterns, watch how people play things, watch the really excited people or the happy ones. But everyone still wonders about things like when will there be an end to space games. Ever? Now? A year from now? This player out there is a moving target and if you don't track him, you're dead."

In contrast with Fogleman and Blough's

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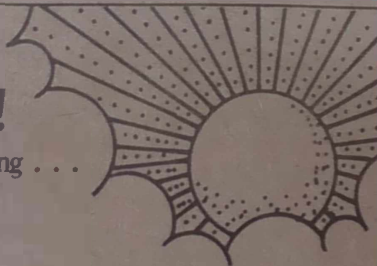
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blithe conviction that those players will be out there playing some kind of video arcade games indefinitely, Hauck sounds more skeptical, and for all his intense loyalty to Gremlin he doesn't sound as if it would break his heart if the video faded. He even confesses to qualms about the games. "I'm a parent and I have to say I worry about the addictiveness of the games. I ask my kids, 'You want a *dollar* to play Pac-Man? What are you going to have for it?' Sure, you can rationalize a little bit. You can say, 'Hand/eye coordination.' Well, great for two games of Pac-Man. But what about the other thirty?"

"I'm really torn. Sometimes I feel like I'm a Christian Scientist pharmacist. I

mean, there are super-good things to do with microcomputers, but I don't consider this one of them. Talk to any honest-speaking game designer and you find him trying to legitimize what he's doing. I feel that way. I want to grow up and do something legitimate some day." Hauck says he's currently responding to that need by spending his weekends trying to find ways of taking \$149 game boards and working on ways to get them to control the paralyzed muscles of paraplegics and make them function again. And then the weekend ends and Hauck returns to creating arcade games, which pays well, and is challenging, and in a way is like playing one of the games themselves.

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